continuance of northerly winds is about to follow. A very high barometer and comparatively low temperature is generally followed by a gentle breeze from S.E., except in summer, when the wind may be fierce from that quarter; with the barometer falling rapidly, the wind will veer round to N.E., and N., accompanied in winter by rain, fog, or dew, and increasing in force; in summer generally a hot wind will set in; unsteadiness in the barometer indicates the shifting of the wind to N.W., in which quarter the barometer is then lowest; after this, with a rapid rising barometer, the wind will shift to W., W.S.W., and S.W., accompanied generally with heavy rain and thunder and lightning; with a still rising barometer the wind decreases in force, inclining towards south, until it has again reached its maximum in S.E. Whenever it blows from N.N.W. or N.W., the barometer, if still falling, should be frequently observed, and as soon as it becomes steady, and the wind is apparently lulling, the shifting of the wind towards S.W. may be expected, which usually takes place with great violence. Gales from S.E. are frequent in summer, and generally commence with a high barometer and light variable winds and calms; towards the height of the gale the barometer falls but slightly, and the wind is then gradually dying away. A steadily falling barometer, with fine weather and light winds from N.N.E. after such a gale, is generally followed by heavy westerly squalls, with much rain and hailstones.

Art. VII.—*An Improved Method of Preserving Wines, Spirits, &c.* By A. K. Smith, Esq.

[Read 28th May, 1868.]

Mr. President and Gentlemen,

The subject of my paper this evening bears chiefly upon a colonial industry of rapidly increasing importance, namely, the manufacture and preservation of wine; but the principle to which I have now to direct your attention may be applied with beneficial results to the preservation of any other liquids in the cellar or on draught, so far as preventing contact with the external air, where such contact is liable to injure the quality of the liquid.

My knowledge of the manufacture of wine is but limited, and at most, theoretical. Having been informed, however,

by the manager of my vineyard at Sunbury, and by other practical vignerons, that a great drawback to the proper manufacture of wine was the difficulty of excluding the air from the casks when the bulk or volume became reduced by absorption, evaporation, condensation, or any other cause, I directed my attention to a simple and inexpensive, though effectual mode of accomplishing this desirable object.

Dr. Guyot,* an eminent authority on the culture of the vine and winemaking, in speaking of the manufacture and the keeping of wine, makes the following remarks :—

"Filling up the casks during the latent fermentation (secondary fermentation).

"If the filling up is indifferent or useless during the initial or primary fermentation, it becomes necessary when that fermentation is accomplished or suspended, and that the latent fermentation replaces it to exist alone henceforward. The filling-up must be done at least twice a week till the next racking off, and with wine of the same age and quality as in the cask. Afterwards, filling-up is done once a month till the next racking-off, and then once every three months till the sale or the bottling off.

Again, speaking of the "Summary of the precepts applicable to the keeping of wines," Dr. Guyot says :—

"It was necessary for me to show the principal influences of the general modifying agents on wines before giving the last observations as concerning the care to be taken after the first fermentation ; a few words will now be sufficient. It will be necessary to observe the following rules, namely :— To fill up completely all the vessels containing wine, firstly, every two or three days, then every week, and every month, and lastly four times a year, and always with the same sort of wine, or wine of the same nature.

"If there is one cask of old wine for which no similar kind can be obtained to fill up, the ingenious process recommended by M. de Mouny in his book of the vigneron is practised. Stones which do not effervesce when put in vinegar or acids are put in the cask, but those stones must be first well boiled in water, and washed afterwards in cold water."

The method here alluded to, of putting stones in a cask to

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* Culture of the Vine and Wine Making, by Dr. Jules Guyot. Translated by L. Marie. Melbourne : Walker, May, and Co., 1865. pp. 72, 87.

increase the volume, and so exclude the air, is, in my opinion, one of those rule-of-thumb plans that, in the absence of any better method, may partially answer its intended purpose, but requires constant care and attention to be of any service whatever.

An acquaintance of mine recently informed me that, before he knew anything of wine-making, he had tried this plan, and the result was, that a small cask of fair wine was changed into bad vinegar, a result so totally unexpected that he thought the great chemical change was due to, or caused by, the quality of the stones that he had put into the wine, rather than by the careless way in which he had managed the operation, as he admitted that the cask was only half full, and the bung left out of it on different occasions for a considerable time.

How, or why, or to what extent, the wine is affected by the presence of air in the casks I will leave others to decide; but as it is admitted by all that its presence is objectionable, I shall now proceed to describe my patent improved method of keeping wines, ales, or other liquids free from contact with the air, and I feel assured it will not be the less interesting to you when I state that it is inexpensive, self-acting, continuous in its action, and thoroughly efficient.

I have here a cask, made of crystal, so that by means of its transparency the whole *modus operandi* can be observed. It is filled with coloured liquid to represent wine. This vessel, having the opening or bung-hole at the upper end, I have fitted the bung in that position; but, under ordinary circumstances, it would, of course, be applied to the top side of the cask.

You will observe that two small stopcocks are screwed into the bung, both of which communicate with the inside of the cask. To the end of one of these stopcocks, marked *A*, is attached an elastic watertight bag or sac, which may be made to contain any quantity, from half a gallon to twenty gallons and upwards. This bag before inflation is passed through the bung-hole of the cask to which it is applied, and hangs loosely in the interior thereof. A second stopcock, marked *B*, opens freely into the interior of the cask. The small water cistern, funnel, and tubes, comprise the whole apparatus, and the mode of action is as follows.

Supposing the cask to be full of liquid, as it now is, the cistern is placed at a slight elevation above the cask, the

maximum height being regulated by the length of the flexible tube attached thereto.

It is of importance thus to limit the length of the tube, for if the cistern be raised too high the hydrostatic pressure might force out the bung, or burst the cask. A quantity of clean water is put into the cistern, and the stopcock *A* is opened, leaving free communication between the cistern and the elastic sac in the interior of the cask. Any quantity of liquid may now be drawn from the cask (limited, of course, to the capacity of the sac under a given pressure), and the cask will still remain full, that is, the space occupied by the liquid so withdrawn is replaced by an equal bulk of water in the interior of the sac. It will thus be perceived that any loss by absorption, evaporation, condensation or any other cause, is simultaneously compensated by hydrostatic pressure, and that the cellarman can at all times, and with impunity, sample his wine without the use of vent pegs or refilling the cask.

As the elastic sac has necessarily a capacity less than that of the cask itself, it occurred to me, when thinking over the subject, that in wine-making establishments it would be necessary to have the power of discharging the water and filling up the cask without removing the bung, leaving the whole apparatus ready for action *de novo*.

This can readily be done, simply and effectively, also by hydrostatic pressure, and for this purpose the stopcock marked *B*, a small funnel, and a piece of elastic tube, are necessary, the action being as follows :—

Remove the cistern from its elevation and place it upon the cask itself; attach the flexible tube with funnel at the other end to the stopcock *B*, raise the funnel to the extent that the length of the tube will allow, and pour the required liquid into the funnel. The result is, that the water contained in the sac is expelled by hydrostatic pressure into the cistern again, the sac itself collapses and leaves room for the liquid so poured in. The cistern can then be replaced, and no further attention will be required till the cask requires to be refilled, when the same operation may be repeated.

The elasticity and capacity of the bag, before use, is ascertained by the hydrostatic pressure ; and the knowledge of this capacity will enable the cellarman to determine what quantity is required to fill up the cask, the time for doing so being indicated by the cask itself, as when the bag is

fully distended no more wine or other liquid can be drawn off.

In conclusion, with respect to this apparatus being self-acting and efficient, you are now in a position to form your own opinions; and with regard to its expense, this will, in a measure, depend upon the number or size of the casks to which it is applied. I may mention, however, that while each bung requires to be fitted with two stopcocks, one cistern may be made to supply all the casks in the cellar, and the small funnel and elastic tube being portable, and only used occasionally, will answer for filling up any number of casks. It is scarcely necessary to add, that all the metal coming in contact with the wine should be tinned or silvered.

As a simple invention, I have protected it in this and the adjacent colonies, with the object of at once taking out patents.

Art. VIII.—*On a Plan for maintaining True Time throughout the City, and on the Railways.*

By Mr. R. L. J. Ellery, President.

[Read 8th June, 1868.]

I think everyone will admit that it is desirable that clocks exposed for public reference, or for the regulation of railway or other traffic, should be kept absolutely correct, or at all events, as nearly correct, and consequently alike in their indications, as possible. In this age, time is money to most people; and the value that may be attached to a single minute in many cases, would, I have no doubt, be more than the whole cost of providing the means of maintaining one absolute and reliable measure of time throughout the city. That the clocks which are exposed for public reference in our streets, in the shop windows and at the railway-stations, do differ in their indications, and often to a serious extent, is well known. How many a punctual business man on his way to the railway or to an appointment gets perplexed at the varying value of the precious period yet at his disposal, as he consults various clocks' faces on his road, each professing to indicate true time.

We may not be quite so bad as Paris was a century ago, where Delambre says the same hour could be heard striking in the different parts of the city over at least half-an-hour of